CLAIMS:

1. A method for forming a silicon-on-insulator (SOI) photodiode optical monitoring system, comprising:

providing a plurality of SOI photodiodes (10; 30), wherein each SOI photodiode includes a silicon substrate (12; 32), a buried oxide layer (14; 34) formed on the silicon substrate, and a silicon layer (16; 36) formed on the buried oxide layer, and wherein the silicon layer of each SOI photodiode has a different thickness;

determining a proportion of incident light passing through each SOI photodiode (10; 30) to the silicon substrate (12; 32) with respect to wavelength and the thickness of the silicon layer (16; 36); and

calculating color component intensities of the incident light based on the determined proportions.

2. The method of claim 1, wherein each SOI photodiode (10; 30) further comprises a field oxide layer (18; 38) on the silicon layer (16; 36), and wherein the different thickness of the silicon layer of each SOI photodiode is provided by varying a thickness of the field oxide layer.

3. The method of claim 1, wherein the silicon substrate (12; 32) is doped with a dopant of a first type, and wherein each SOI photodiode (10; 30) is formed by:

forming a trench (20; 40) through the silicon layer (16; 36) and the buried oxide layer (14; 34) to expose a portion of the silicon substrate;

doping the exposed portion of the silicon substrate with a dopant of a second type to form a pn-junction; and

forming a contact (24, 44) in the trench.

4. The method of claim 3, wherein the contact (24; 44) forms an aperture (26; 46) of the SOI photodiode (10; 30).

5. The method of claim 1, wherein the proportion of incident light is given by $e^{-a_\lambda x}$, where a_λ is an absorption coefficient of the silicon layer (16; 36) and x is the thickness of the silicon layer.

6. The method of claim 1, further comprising:

forming a vertical pn-junction in the silicon substrate (32).

7. The method of claim 6, wherein each SOI photodiode (30) is formed by:

forming a trench (40) through the silicon layer (36) and the buried oxide layer (34) to expose a portion of the silicon substrate (32); and

forming a contact (44) in the trench.

8. The method of claim 6, wherein the contact (44) forms an aperture (46) of the SOI photodiode (30).

9. A silicon-on-insulator (SOI) photodiode (10; 30), comprising:

a silicon substrate (12; 32) having a first portion doped with a first dopant type and a second portion doped with a second dopant type, the first and second portions forming a pn-junction;

a buried oxide layer (14; 34) formed on the silicon substrate;

a silicon layer (16; 36) formed on the buried oxide layer, wherein an amount of incident light passing through the SOI photodiode to the silicon substrate with respect to wavelength is proportional to a thickness of the silicon layer;

a field oxide layer (18; 38) formed on the silicon layer, wherein a thickness of the field oxide layer controls the thickness of the silicon layer;

a trench (20; 40) extending to the silicon substrate; and

a contact (24; 44) formed in the trench.

10. The SOI photodiode (30) of claim 9, wherein the pn-junction is a vertical pn-junction.

11. The SOI photodiode (30) of claim 9, wherein the proportion of incident light passing through the SOI photodiode to the silicon substrate (32) is given by $e^{-a_\lambda x}$, where a_λ is an absorption coefficient of the silicon layer (36) and x is the thickness of the silicon layer.

12. The SOI photodiode (30) of claim 9, wherein the contact (44) forms an aperture (46) of the SOI photodiode.

13. A method of forming a silicon-on-insulator (SOI) photodiode (10; 30), comprising:

providing an SOI structure including a silicon substrate (12; 32), a buried oxide layer (14; 34) formed on the silicon substrate; a silicon layer (16; 36) formed on the buried oxide layer, and a field oxide layer (18; 38) formed on the silicon layer;

adjusting a thickness of the silicon layer by adjusting a thickness of the field oxide layer, wherein an amount of incident light passing through the SOI photodiode to the

silicon substrate with respect to wavelength is proportional to the thickness of the silicon layer;

forming a trench (20; 40) to expose a portion of the silicon substrate; and

forming a contact (24; 44) in the trench.

14. The method of claim 13, wherein, prior to forming the contact (24), doping the exposed portion of the silicon substrate (12) with a dopant to form a pn-junction.

15. The method of claim 13, wherein the silicon substrate (32) comprises a vertical pn-junction.